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Integrated Information Theory

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Message from the Guest Editors

Dear Colleagues,

Originally developed to address the problem of consciousness and its physical substrate, integrated information theory (IIT), in its latest version ("IIT 3.0"), provides a quantitative framework to analyze the compositional causal structure of (discrete) dynamical systems. In particular, IIT's formalism is based on a notion of information that is physical and intrinsic (observer-independent), and a set of causal principles ("postulates"), including causal composition, specificity (information), irreducibility (integration), and causal exclusion.

IIT's main quantity, a system's amount of integrated information (F, "Phi"), has been employed as a general measure of complexity, but is computationally intractable for large systems.

For this special issue, we invite contributions that apply, discuss, compare, or extend the theoretical framework of integrated information theory, specifically its latest version, IIT 3.0. Submissions proposing approximations, practical measures, or alternative formulations of (parts of) the IIT formalism are also welcome.

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Editor-in-Chief

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Message from the Editor-in-Chief

The concept of entropy is traditionally a quantity in physics that has to do with temperature. However, it is now clear that entropy is deeply related to information theory and the process of inference. As such, entropic techniques have found broad application in the sciences.

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